ADULT LEARNERS:

Teaching Strategies
to
Improve Learning
and
Comprehension

WRITTEN BY

Teresa Sweeney, **RMC Research Corporation** and Jennifer Cromley, Consultant

November 2002

TABLE OF CONTENTS

Introduction

The purpose of this booklet is to explain the most effective strategies, supported by research, for teaching adults. The strategies apply to teaching all types of content, with the ultimate purpose being to improve adults' learning ability and comprehension. While these strategies are applicable to any type of adult learner population, this booklet is aimed at those enrolled in adult education programs providing basic, secondary, vocational or high school credential services. (The phrases "adult learner" and "student" will be used interchangeably throughout.)

The booklet highlights key research-based instructional strategies for improving adults' learning outcomes and skills. Each strategy has been formally evaluated with hundreds, and in some cases thousands, of learners. The majority of these strategies work with both adults and children, making them especially appropriate for family literacy programs. The strategies also have dual applications: (1) for educators who teach adult learners, and (2) for adults to apply to their own and their children's learning endeavors.

The first section focuses on five aspects of curriculum and instructional planning:

- Conveying **high expectations** of learners
- Using and developing **background knowledge** to aid in learning new information
- Encouraging and supporting **active student involvement** in learning
- Developing students' awareness of their own thinking, called **metacognition**
- **Assessing** students' knowledge and skills using standardized tests and real-world assessments, and providing **regular feedback** to students on progress and areas that need improvement

The second section describes eight teaching techniques:

- Directly teaching **learning strategies**
- Using **examples and analogies**
- **Memory techniques,** including learning for understanding, practice and mnemonics
- Building students' knowledge of key **concepts**
- Using **multi-sensory** techniques
- Using **cooperative group learning** and **discussion**
- Incorporating **problem-based learning**
- Teacher **task analysis** of lessons

Making these methods and strategies the core of instructional programming for adults can enhance:

▼ Adult learner outcomes

▼ Parents' understanding of how to approach their academic and life skills learning in multiple contexts, such as adult education, parent education, and workplace learning

▼ Parents' understanding of and ability to apply learning techniques to support their children's learning

▼ Integration of adult and child services and instruction by staff

High Expectations

KEY POINT *Creating a culture in the classroom and the program where achievement is expected can bolster student learning.*

Many of our adult students were not successful in school. Many were consistently behind their peers academically, which is one of the most cited reasons for dropping out of school. So students come to us with low confidence in their ability to learn. At the same time, they have *some* belief that they can learn, otherwise, why would they come? Instructors need to communicate to students that they believe they can learn regardless of their previous school experiences. Holding high expectations of students should also encourage instructors to be creative in explaining things in multiple ways, teaching powerful learning strategies, and using examples that are familiar and relevant to students.

Examples in Practice:

Adult Education. Cara, an administrator, went to a pre-GED "graduation" ceremony at a nearby program. As the students received their certificates, many of them talked about the encouragement they got from their teachers, how the students supported each other, and how much work the students themselves had put into studying and learning. Cara decided that a similar ceremony at her program would send the message that staff and students had high expectations for learning, and that students could meet those expectations if they did the work.

Parenting Education. Fran, a parent and early childhood instructor, noticed that she and her fellow staff were very enthusiastic about the parents' learning potential when families were new. But staff and parents got a little dejected and pessimistic after a few months. Fran thought they might need more encouragement, so she decided to create a "wall of fame" where students would post index cards when they got a child a library card, started a reading routine with their children, went to a parent-teacher conference, and other important activities. This encouraged a "culture of learning" where all parents and staff got the message that everyone could, and was expected to, make progress.

Background Knowledge

KEY POINT *The human mind learns and remembers by connecting new information to old. If a person does not have existing knowledge to connect new information to, then learning is extremely difficult.*

Adults often have much knowledge about their jobs, how to deal with domestic and daily issues like paying bills and transportation, and other knowledge that children are not likely to have. However, it can be surprising how little knowledge some adult learners have about academic or school-related topics. For example, they may not know what it means to declare war, where different foods come from, how to figure out the change due for a purchase, or that American pioneers did not drive cars. As instructors with far more education, we take this type of background knowledge for granted.

A lack of background knowledge can make it difficult for students to read, learn, and remember what they have learned, especially from textbooks and other materials used in typical adult education classes. Background knowledge also helps students comprehend what they read, figure out new words, figure out the answers to questions (solve problems), and apply their skills in new areas (transfer).

To enhance adults' background knowledge, teachers of adults need to expose them to new information through reading, field trips, discussions, and hands-on learning activities. While sticking to topics that students already know about may be more comfortable for all, it will not help students learn very much. Teachers should check each lesson to identify the foundational information that is needed to understand it (see **Task Analysis**), and then be sure to teach that information instead of assuming that students know it already.

Examples in Practice:

Adult Education. Jennifer, a basic literacy tutor, has realized that her student does not understand the taxes and benefits on his pay stub. She explains each box on one pay stub, and has him explain back to her using another pay stub. To relate this to his reading instruction, they also use words like tax, box, and net from the form to work on his decoding skills.

Parenting Education. Teresa, a parenting instructor, has realized that the parents she works with do not know much about how children learn to speak, or the importance of having conversations with young children. She invites a child specialist and several parents who have graduated from the program to come speak to her class. After a presentation and modeling of conversation techniques, her students role-play the kind of conversations and questions that would be appropriate with their toddlers.

Active Learning

KEY POINT *Adults learn better when they are actively involved with the material being taught.*

Learning is much less likely to occur when students passively listen or observe than when they are actively involved. Learners need to think about new facts, ideas and skills; use them to think about questions (problem solving); and apply them to new areas in order to effectively learn and retain information. Active involvement on the part of the learner can take many forms, for example:

- *answering questions*
- *hands-on activities*
- *doing worksheets*
- *creating questions*
- *summarizing*
- *teaching another student*
- *doing a project*
- *taking notes or writing about*
- *engaging in discussions*
  a presentation afterwards

It is crucial that students actively work with the facts, ideas, and skills they are learning, rather than just hear someone talk about what they are supposed to learn. For example, students learn more from a field trip where they take notes, fill out a checklist, or write a report about the trip, than when they simply attend and observe. Self-study, which is often presumed to be active because the student is self-directed, can also be very passive if the student simply reads whatever is assigned but does not engage in additional learning activities. Self-study can also be very frustrating to students if they do not have the background knowledge, skills, and strategies to learn from a textbook (see **Background Knowledge** and **Direct Strategies**).

Examples in Practice:

Adult Education. Catherine, a GED teacher, inherited a geometry class from another teacher. The students were used to sitting silently, reading their textbooks and doing written exercises for the 45-minute class, and only one or two students ever raised a hand to ask for help. Catherine wanted to change this and encourage participation, so she decided to begin each class with a real-life math problem for the group to discuss. After a brief class discussion about different ways to solve the problem, she put the students into small groups and asked them to prepare and present their answers to the real-life problem and one from the textbook. The groups needed a lot of help to learn how to explore problems together, but by the end of the semester they were making good progress and had learned an important work skill, too (see **Learning in Groups**).

Parenting Education. Chris, a parent educator, was concerned that the parents needed more than just information on how they contribute to their children's language development. She

usually began her sessions with a 20-minute overview presentation and then asked for questions, but no one ever said anything. She decided to make her sessions more interactive by helping parents become better observers of their parent-child conversations. She now plays audiotapes of parents and children talking together during her presentation, and asks parents to listen for certain aspects of the conversation; for example, the use of "encouraging words" versus "discouraging words," or the use of open-ended versus close-ended questions. Parents then discuss their observations and ways their conversations with children could be improved. As a next step, Chris is encouraging parents to take home tape recorders so they can record and critique the typical, everyday conversations they have with their children.

Thinking about Thinking (Metacognition)

KEY POINT *Adults enhance their ability to learn and understand information when they can "monitor their own thinking."*

As children mature, they become more aware of their own feelings, thoughts, and preferences. So we might assume that adults, who have more life experience, often reflect on their own thinking related to learning — about how well they understand something from a lesson or if they have mastered certain material and are ready to take a test. However, adults' level of personal self-awareness does not automatically transfer to school learning. This is partly because it is hard to be aware of how well you are doing when you do not know much about a subject. For example, can you find the error in this paragraph?

> *Correlation is a measure of association between two variables. A correlation can be positive or negative; a positive correlation means that an increase in one variable is associated with a decrease in the other variable. Positive correlations range from >0 to 1, negative correlations from <0 to −1.*

Probably not, unless you know something about this particular statistics topic. You may not know enough to decide what to pay attention to or where to look for errors.

How can we teach students to monitor their own level of understanding? One of the most effective ways is to ask them "Why" questions: Why do you say that? Why did you give that answer? What information is your answer based on? (It is important to ask "why" even if the answer is correct.) We can also teach specific learning strategies, like summarizing or generating questions, that help students realize whether they comprehend what they have learned. And we can send a strong message that the ultimate purpose of education classes is *understanding* what we learn, not just getting the answer right. This can help students get in the habit of checking their understanding as they study, and not just looking for an answer that "looks like the question."

Examples in Practice:

Adult Education. Steve, a workplace literacy instructor, observes that students are very good at noticing whether they understand a work ticket, but not so good at noticing whether they understand what they read in an instruction manual or a textbook. It occurs to him that there may be a lot of vocabulary they do not understand in the text, so they cannot monitor their comprehension. He decides to pre-teach vocabulary related to assigned reading, discuss the selection, ask "why" questions, and also "think out loud" to students while he reads from the selection, so that he can demonstrate comprehension monitoring to them. Later he will teach students to summarize what they read. Gradually, he starts to see students asking about vocabulary words they do not know, re-reading, and monitoring their comprehension in other ways.

Parenting Education. Bob, a family literacy educator, finds his students are very aware of using the correct amounts of ingredients (for example, salt) when they cook, but are not good at monitoring the amounts of medicine they give children in a dropper. He realizes they may not know what to check for — the children's age or weight — and the units of measurement (milliliter or teaspoon). He decides to do a demonstration using over-the-counter medicine, showing how to check whether the right amount has been measured, and giving several examples. Students later tell him that they are now checking, and sometimes correcting, the amount of medicine they give their children.

Testing and Assessment

KEY POINT *Assessment and feedback can help both teachers and students, but only if appropriate assessment tools are used and administered correctly.*

When tests are fair, appropriate for their chosen use, administered correctly, and the results are interpreted and used to inform instruction, they benefit both teachers and students. Appropriately used assessments can:

- identify strengths and areas that need work
- show progress, and
- raise expectations for achievements.

Both studying for a test and taking a well-designed test can be learning experiences. Studying (which is a form of practice) helps students remember information better, and thought-provoking test questions can help students better understand the material. Other types of assessment, such as portfolios and projects, can serve the same purposes. But all "formal" tests must meet certain requirements; they must:

- show what they actually say they show (validity),
- give similar results for similar levels of skill (reliability),

● be aligned with what is taught and emphasized in classes, and

● be used for the purpose for which they were designed.

For example, the Gates-MacGinitie reading comprehension test shows how well students comprehend compared to other students. It is not designed to show the teacher what aspects of comprehension a student struggles or needs help with, and it is not fair to expect the test to do that. Two students with "6th grade comprehension" can have very different needs: one might read fluently but not have enough background knowledge or vocabulary to understand the text; the other might stumble over every other word because he lacks decoding skills, even though he has the necessary background knowledge and vocabulary. The "6th grade level" rating provides no information about important differences between the students.

In general, it is more difficult to find non-traditional assessments that are valid and reliable, and it is difficult to find traditional assessments that are aligned with what is taught and emphasized in adult education classes. It is very important to follow the directions for administering a test, including placing students, example problems, time limits, parts of the test that should be read aloud, and other details.

Tests are different from each other in important ways, and teachers need to understand these differences. For example, the CASAS (Comprehensive Adult Student Assessment System) are competency-based tests that measure mastery of sets of skills. Regardless of how well or poorly students across the country score on the CASAS, a higher score shows greater mastery of the skills being tested. By contrast, scores on the TABE (Test of Adult Basic Education) and GED (tests of General Educational Development) are "normed" or based on how well other students do. A small number of correct answers might get the student a high score in some sections of the test, since the threshold is set by the passing scores of other students. Since the test publishers do not publish textbooks that are aligned with the tests, teachers need to look carefully at their curricula and make sure the necessary, related topics are covered that will prepare students to perform well on the tests.

Both students and teachers should practice with the tests they will take so that they know what to expect. Both students and teachers should be familiar with question formats, basic test-taking strategies, and the experience of taking tests with time limits. However, time spent on test-taking practice should not be greater than time spent on building background knowledge, learning new strategies, doing a lot of reading, and other activities that help students learn new content and skills.

Finally, students need regular feedback on all kinds of assessments, whether they are homework, classroom tests, portfolios, or standardized tests. Without feedback, students cannot know what they have learned, what strategies are working, and what they still need to work on. Imagine if you were learning to play a musical instrument and your teacher never told you what you were doing well — for example, "Your rhythm is really good, but you are missing a lot of notes, so we need to work on precision." To apply this to adult education, when a student takes a

GED practice test, the teacher can show the student specific areas that he has mastered (e.g., got 90% of the arithmetic questions right), and areas to target (e.g., only got 50% of the algebra questions right, or ran out of time and did not answer all the questions, so the student should work on speed).

We can also help students by connecting their assessment results to their learning practices. If a student's reading score has improved, we can show her how that relates to the increased reading she has been doing. If a student does poorly on a unit spelling test, we can explain that more practice with the spelling words would improve her performance. Feedback that connects results with active student learning is called *attribution*. Feedback should not be about simply showing up for class, but about what reading, class participation, writing, homework, and other active learning activities students can do to enhance their progress.

Examples in Practice:

Adult Education. The program that Keith, a GED instructor, teaches in switched from the ABLE (Adult Basic Learning Examination) to the CASAS. The first time Keith's students took the test, they didn't score very well. Keith found out that the CASAS had more graphs, tables, and maps than the ABLE. So he added more practice with graphs, tables, and maps to his science and math classes. The next time his students were tested, their scores improved (which certainly improved motivation). Keith discussed each student's tests scores with them to explain where they had improved and where they were weak. In addition, because the revised GED also had more graphs, tables and maps, and passing the GED was his students' primary goal, Keith tried to explain how the material they studied in class related to those tests. Keith's administrator also looked at the test scores for different classes and saw that Keith's class was showing particularly good progress. She asked him to do an in-service workshop for other teachers.

Parenting Education. Louisa worked with parents on expanding their vocabulary and discussions with their children for a few months before her program re-assessed the children using the PPVT (Peabody Picture Vocabulary Test). For example, she had encouraged parents to be more explicit when giving children directions, such as "Please put your teddy bear in the toy chest" instead of "Put that thing away!" The early childhood teacher told her that the children showed improvement on the PPVT, and the parents beamed when Louisa told them the results.

Consider this scenario:

Mr. Bates is having a hard time with his pre-GED social studies class. They are learning about the Civil War, and he had them watch a 10-minute video, read a passage in the textbook, and now they are trying to do a fill-in-the blank worksheet. The students just don't seem to be getting it, and they are frustrated because they have made sacrifices to be in class and they need to get something out of it. Mr. Bates is getting frustrated with them too, and wonders what he can do to make these lessons more effective.

What specific instructional strategies could this teacher use to improve his class? Here are examples of some of the best, proven approaches.

Direct Strategy Instruction

KEY POINT *Using direct strategy instruction and teaching students how to use particular strategies can help them learn more effectively and independently.*

In most subject areas, there are specific *problem-solving strategies* that are used. For example, science uses cause and effect, reading includes strategies for figuring out what a word means, and math includes specific procedures like addition and subtraction. As instructors, we may take these skills for granted. How could anyone not know about cause and effect? But many students never had the chance to learn these strategies, so we need to teach them.

Although every subject has its own set of strategies, there is a general approach for teaching a strategy:

1. Explain what the strategy is and why it is useful.
2. Demonstrate doing the strategy using a real-life example, explaining step-by-step.
3. Give students a practice problem (individually or in groups).
4. Monitor students and guide them as they do the first practice problem.
5. Give specific feedback on how they did.
6. Connect success with using the strategy.
7. Give students more practice, feedback, and attribution.
8. Continue giving practice problems until students can use the strategy without prompting from you.

Here is an example from adult basic education:

1. "Today we are going to work on forming 'good questions' about what you are reading. Forming questions can help you understand what you are reading better. It is helpful when

you are studying for a test or reading for meaning. It is not a good strategy if you are just skimming to find a single fact."

2. "A good question asks about an important idea, feeling or fact from the story, not a trivial detail. Let's talk about the book we're reading, *Pink and Say*, which is about the Civil War. One of my questions is, what is the relationship between Pink and Say? Are they friends? Brothers? Enemies? I think the answer is going to be important for understanding the story. Let's start reading Chapter 1 to see if we can find the answer. Well, it looks like Pink and Say are friends, even though I expected them to be enemies because they are on opposite sides of the Civil War. I know they are friends because of how they talk to each other and how they help each other."

3. "Now I want you to work in your small groups, read a little further into Chapter 1, and form a question, something you are wondering about based on that text. Remember to focus on an important idea, feeling, or fact from the story, not a detail like 'What was Pink wearing?'"

4. The teacher checks in with students and guides them as they do the first practice problem, helping those who are having difficulty identifying and focusing on important ideas suggested by the story. The teacher suggests they use "question words," such as "who," what," "when," "where," and "how."

5. "You all did really well at coming up with questions — everyone used the question words. Now I want you to focus on what pieces of information you need to get from the story in order to understand what is happening and what it means as you read — the ideas, feelings or facts."

6. "Do you see how forming questions while you read helps you understand a story better?"

7. "Your homework is to use this strategy on the homework reading, which is Chapters 1 and 2 of *Pink and Say*. I want you to write down your questions, and what you find or predict the answers are from the reading."

Using specific strategies takes a lot of time and practice by students to be successful, but it is the only method that has strong evidence for increasing reading comprehension. Here is an example from parenting education:

1. "Today we're going to work on a way to let your children know you hear what they say. It's called *acknowledgment*. It may help you get into fewer fights with your school-age children. This is something you can use every day, in many different situations."

2. "When I *acknowledge* someone, I repeat back what they said, even if I disagree with them. For example, my daughter wanted pizza for dinner, and when I told her I already started to make meatloaf, she started to complain. Rather than yell at her, I repeated back what she said, 'You said that you want pizza for dinner, because we haven't had it for a while.'

I also repeated back her feelings, 'I know you really want pizza, and you're disappointed that we don't have it.' Notice that I didn't focus on what I wanted or my feelings; I just repeated back what she said. Now, we still didn't have pizza that night, but I told her I would consider it for tomorrow night. And she stopped whining because she knew that I really listened to what she said, what she wanted, and how she felt."

3. "Now I want you to work in pairs and role-play. One of you is the child who wants a toy in a toy store, and the other is the parent, who is going to acknowledge what the child says. Remember to focus on what the other person says and feels, not your own opinion."

4. The teacher checks in with students and guides them as they do this first practice problem, praising them for focusing on the "child's" statements, and reminding them to do that if they are not.

5. "You all did really well at repeating back just what was said. I know it's hard, because you want to give your own opinion. Two of the pairs were particularly good at repeating back feelings, too."

6. "Do you see how using *acknowledgment* can help you fight less with your kids?"

7. "Your homework is to try this once with your kids before we meet again, and come back and tell us how it went."

Using Examples and Analogies

KEY POINT *Using examples and analogies is a powerful way to build on what students already know.*

As described in **Background Knowledge**, the human brain learns new information by connecting it to old information. Using examples is one of the most powerful ways to connect new information with what students already know. You may notice that the examples given in this booklet help you understand and relate to ideas that at first seem abstract or difficult. One specific method for using examples is to compare a new situation to an old one. To illustrate, here is an analogy for explaining how kidneys function: "Think about how a coffee filter lets liquid through, but not the solid coffee grounds. The kidneys are like that — they let liquid through, but the solids, like blood cells, can't escape."

To use examples and analogies effectively, attend to these factors:

● Be sure students are familiar with the example you are using (do they make coffee?).

● Start with the familiar example (making coffee), then connect it to the new one (the kidneys).

● Explain exactly *how* the two things are alike. For example, to explain how to read a table or grid in a science text, you may say it is similar to the TV schedule in the newspaper. This is a good start, but you need to draw out the analogy. List the correspondences between

the two. For example, in both, you look at the intersection of one row and one column, and it is that cross-referencing of words and/or numbers that gives the grid meaning.

- Explain how the two things are *not* alike. Going back to the coffee example, coffee machines produce a tasty beverage, whereas kidneys produce waste.
- Finally, be sensitive to cultural issues. For example, if you use animals, are students comfortable with making analogies between people and animals? Do those animals have a specific cultural meaning to some students?

Memory Techniques

KEY POINT *The ability to retain and retrieve information can be enhanced by using specific memory techniques.*

There are several proven memory techniques that can help students remember all the new facts, ideas, and skills they must absorb and learn. Before choosing a technique, it is important to figure out what kind of information you want students to learn:

- ▼ Do they need to remember a complex concept (like democracy or photosynthesis)? If so, *learning for understanding* is what they need.
- ▼ Do they need to remember a completely arbitrary fact (like 6 x 7 = 42 or the spelling of the word "science")? If so, *practice* is what they need.
- ▼ Do they need to learn a rule, shortcut or pattern (like the "I before E" spelling rule or the order of operations in math)? If so, memory tricks called *mnemonics* can help. *Association* could also be the best method here.

Here are descriptions of some memory techniques.

Learning for understanding

Concepts that are foundational to the study of academic subjects, like evolution or democracy, are complex and cannot be memorized. Students need a lot of experience with information about these concepts in order to understand them. An instructor may assume that students understand the concepts contained in material they are teaching because students can correctly answer multiple-choice and fill-in-the-blank questions related to the material. But, in many cases, these exercises can be done without understanding the concepts because statements can be found in the text that match the questions. Students may also seem to understand many concepts because they come to school with strong (and largely functional) ideas about how the world works. But sometimes the sequence of logic that results from applying what they know factually to more theoretical and complex knowledge creates false conclusions.

For example, adults know that animals must eat to live, and that plants need water and soil to live, so they may conclude that plants "eat" soil. It may be difficult to explain the concept of photosynthesis — that plants have a radically different way of getting the energy they need to live from soil, water, and light.

In addition to the methods mentioned previously (building factual knowledge, direct strategy instruction, active learning, using examples and analogies), you can build students' knowledge of concepts by doing the following. Using the example of "democracy":

- Define (1) what the concept is, and (2) what it is not (democracy is not the same as capitalism).
- Give examples of democratic countries (United States, France), and examples of non-democratic countries (China, Cuba).
- Have students dissect and sort examples and non-examples by key factors, and come up with their own examples and non-examples.
- Lead students in a discussion about the factors related to democracy that have been identified, and prompt them to explain what they mean by asking "Why" questions.
- Have students write about the topic of democracy, both to help them use new vocabulary presented in text and discussions, and to help them (and you) see if they understand it.

By giving examples, using discussion, asking "Why" questions, and having students work with the new information, instructors can help them take many separate pieces of information, connect them in a way that leads to understanding, and remember what the concept means.

Making practice interesting

Practice is vital for learning anything well. But dull, rote practice often turns students off. Some ideas for making practice more interesting are:

- Turn it into a team game — students can practice addition or multiplication by playing a card game, or practice vocabulary and spelling by playing Scrabble.
- Create an assignment that uses computers or has a real-world connection — writing a letter to a company or political representative, or making a family budget and using a computer to create a document with a table or graph.
- Do five minutes of group drill to fast music.
- Teach students to give themselves a reward after practicing for a certain amount of time — they can watch 30 minutes of TV after studying for 30 minutes.
- Have parents practice basic skills — like the alphabet, counting, addition and multiplication tables — with their school-age children.

Some information and facts simply have to be memorized, and students should be made aware of this. On the other hand, not *everything* has to be memorized. For example, only one-half of the multiplication table needs to be memorized — a student who knows 4 x 6 = 24 should also know that 6 x 4 = 24. Memorization is very important, but it should be used judiciously.

Mnemonics

Many important facts are also totally arbitrary, such as the steps in long division (Divide, Multiply, Subtract, Bring down — DMSB). As teachers, we can make these arbitrary facts more memorable by using phrases, letters or stories. For example, the steps in long division can be remembered as Does Math Seem Bad? or some other such phrase, which is called a *verbal mnemonic*. Some well-known verbal mnemonics include:

- Arteries go Away from the heart.
- Every Good Boy Does Fine for the written musical notes on the upper register lines of the staff (E, G, B, D, F).
- SOHCAHTOA the famous chief of the Trigonometry tribe (Sin = Opposite over Hypotenuse, etc.).

Rhymes are another type of mnemonic, with some examples being the number of days in the months (30 days hath September . . .), spelling rules ("I" before "E" except after "C"), and multiplication tables ("2 times 4 is 8, that's great"). Some programs use rap, playground chants or other music genres to make up mnemonics.

A third type of mnemonic is a cartoon, such as four quarts of milk playing musical instruments as a way to remember "quartet" (this mnemonic was devised by GED students).

Mnemonics are very effective, and they are even more effective if the students make up the phrases, key words, songs, or drawings themselves.

Association

A fourth proven memory technique is association — memorizing one thing, and then connecting or associating other things to it. For example, students only need to memorize the spelling of "science" and then they can associate the spelling of "scientific" and "scientist." Likewise, students can sound out the spelling of "democratic," and learn that "democrat" and "democracy" are spelled using the same root pattern. Learning "pediatrician" helps you figure out "pediatrics" and "Pedialyte." Likewise, memorizing 4 x 6 = 24, and then learning that 6 x 4 = 4 x 6 = 24 is an example of association.

In summary, the key to helping students remember information better is to make whatever they are learning meaningful in some way, whether that is understanding why the information is useful, getting a conceptual understanding of it, or making it memorable with a rhyme, song, picture or association.

Multi-sensory Learning

KEY POINT *Learning through many senses is usually more effective than using only one sense.*

When you learn a song, you learn the words and you also learn the tune. If you are trying to remember the lyrics, certain key words (like the refrain) or the rhyming pattern may be clues, but the tune the words are set to can also help you remember the lyrics. For a science lesson, students may learn more about chemical reactions if they read and discuss them, plus do a simple experiment of mixing vinegar and baking soda to "experience" the reaction. Many students will comprehend better if they read along while listening to a book on tape, rather than just doing one or the other. If students have never seen an object they are learning about — for example, a compass or an eggplant — getting their hands on one can help them understand its properties much better than simply reading and trying to imagine what it looks, feels, and smells like. These are all examples of how multi-sensory learning can be more effective than using a single sense.

In addition, there are different skills associated with reading, looking at diagrams, doing (e.g., planning), observing (e.g., what to watch for), and discussing. So when teachers engage students' many senses, they are also teaching a wider range of skills. Students also get to use the information in multiple ways, instead of only associating it with how it was used in a lesson. Multi-sensory learning may also help students be more creative at answering questions. For example, the problem $2/3 \times 3/4 = ?$ is much more efficient to solve visually than mathematically, and timed tests like the GED and SAT reward efficient problem-solving.

Multi-sensory learning may also help students break out of habits or preferences that restrict their learning. The student who "likes to listen, but hates to read" is never going to become a better reader by listening. Exposing students to new ways of learning, and helping students feel more confident with them, can make a big difference in how much and how well they learn.

Learning in Groups

KEY POINT *Working in groups can help students learn and increase retention, but students often need coaching in specific group skills.*

Working in pairs or groups may help adults in several ways we have already touched on:
- People bring different perspectives and problem-solving approaches to tasks.
- People bring different skills and knowledge to tasks, so each student can have a role in performing the work.
- Group work teaches social skills that are useful at home, at work, and in the community.

- Peer mentoring, and the development of friendships or support networks, can increase commitment and retention.

There are several key factors to keeping groups running smoothly:

- Agree as a class what the ground rules will be before people start working in groups (e.g., everybody gets a chance to speak, listen to and do not interrupt each other, stick to the facts if you disagree).
- Assign roles. Who will take notes? Who will report for the group? Who will facilitate the discussion? Who will look up information and use resources? Who is the computer expert? Students may need a mini-lesson in certain skills, like how to take notes or how to report for the group (e.g., Should they summarize? State when the group had differences of opinion?).
- Give a clear assignment, with a clear result that the group is supposed to produce (e.g., do a presentation, turn in the notes) and a time limit.
- Be deliberate about whether you make groups mixed-ability (more knowledgeable teach less advanced) or similar-ability (with appropriate assignments for each group), and take extrovert and introvert personalities into account. Consider switching group members periodically, and be willing to reassign members if a group is not functioning.
- Monitor the groups. They may need help with knowledge gaps, getting stuck on a question, or group process. Use these check-ins as an opportunity to give a mini-lesson or reinforce the purpose of a process.

In summary, group work can help students learn better, and it builds important social and work skills. Teachers should be aware that it takes time to plan appropriate activities and work products, decide how to arrange groups, help groups think through their answers, fill in missing information, and deal with group process and personalities.

Problem-Based Learning

KEY POINT *Problem-based learning enhances mastery and comprehension of content by combining a variety of learning and instructional strategies and critical thinking skills.*

One way to combine many of the strategies in this booklet is to present a "real-life problem" that students research over the course of several weeks and for which they create some kind of report, presentation, or product. This approach is called *problem-based learning*. A key aspect of problem-based learning is that it starts with a fairly complex problem that creates a "need to

know" rather than with a fabricated scenario from a textbook. Problem-based learning projects are done by groups of students working together but drawing upon their individual skills and knowledge to solve a real world problem that they are interested in pursuing.

Here are some examples of problem-based learning projects:

● An adult education program plans to go on a field trip to a nearby historic site. Students are assigned to figure out and create a plan for what this trip will entail. The group assignment that springs from this includes tasks such as creating a budget, securing accommodations and transportation, advertising the trip to other students, and managing registration and fee collection. Students then go on the field trip – which provides a great opportunity to relate the actual experience on the road and at the site to material studied in classes.

● The students in a GED program create an orientation for new students about the GED, and what it takes to successfully prepare for it. Students read about the GED test in print and on-line, interview GED graduates, and gather information via phone and e-mail from the local GED testing center. They write a brochure and also do presentations to all incoming students.

● A family "tells its story," interviewing family members to get oral histories, collecting and taking pictures of family members, making maps of their travels over time, and creating genealogy trees.

There are several key factors to a successful problem-based learning project:

● The problem has to be interesting to students.

● It must be complex, so that there is not an obvious or single-step solution, but not so difficult that students cannot do it.

● Students need to have access to the information they will need. Higher-level students may do their own research, while the instructor may lead lower-level students directly to the best resources.

● The instructor needs to explain how the project's learning goals are relevant to the student's academic goals.

● The information that students gather must be relevant to the problem (not just "generally useful").

● Problem-solving methods or specific skills may need to be explained along the way. For example, if students need to create a budget but have never done one before, the instructor should help them identify the steps and skills necessary (see **Task Analysis**).

● The instructor needs to encourage students to persist with solving the problem since it is, by nature, a bit challenging and difficult. This can take many forms: suggestions, coaching, directive questions, hints, or providing resources.

● The teacher needs to monitor the groups to make sure they are on task and that they are not stuck.

Analyzing Lessons (Task Analysis)

KEY POINT *If instructors analyze what students need to know and be able to do before they teach or assign lessons, students are more likely to benefit from the lessons.*

One implication of these various instructional strategies is that instructors need time to determine what new facts, ideas, and skills students need for each lesson. These might include all of the areas that have been discussed: background knowledge (and any competing ideas that students bring to their learning), specific learning and teaching strategies that are needed, and the metacognitive monitoring that students need to do for comprehension.

For example, to read the book *Pink and Say*, which takes place during the Civil War, students will need to be able to read the words (decoding), they need background knowledge about the Civil War (who the two sides were and some reasons for the war), they need to know the meaning of subject-specific vocabulary, they have to be able to draw conclusions from the reading (e.g., why a character did what he did), and decide what strategies might be useful (e.g., predicting what would happen next).

The instructor now needs to decide the best way to teach all these things. This process of thinking through what is needed is called *task analysis*. For example, will he or she build or activate background knowledge and vocabulary predominantly by lecture, or by leading a student discussion? The decision will depend on the time available, the group of students and their own schooling experiences, how well they have coalesced as a group, and so on. Will the lesson focus on teaching a new strategy, or practicing one that has already been learned? Is the focus more on strategy use or monitoring? Again, the decision depends on things like whether this book is suited to teaching a particular strategy, what was covered in the previous lesson, and how confident the students are with a strategy.

This booklet began by stating that these instructional approaches and strategies were especially appropriate for family literacy programs because they were applicable to both adults and children. In teaching, as in life, doing something new or differently requires change and a plan to create that change. So what are the implications of incorporating these teaching strategies for program design and management? First of all, there are several steps involved in translating the research upon which the strategies are based into practice:

- First, administrators and instructors must be knowledgeable about the research findings that relate to the services and instruction they provide.
- Second, they must plan for and provide appropriate staff training and materials for interpreting the research findings and relating them to practice.
- Third, using these research findings, training, and materials, they must determine what changes need to be made in curricular planning and instruction.
- Fourth, instructors need time for both individual and joint lesson planning to incorporate these changes.
- Fifth, administrators need to plan for on-going support for professional development in research-based methods and evaluating how they affect participant progress and overall program outcomes.

Combined, these steps essentially focus on two factors: the quality of instructional staff and of evaluation methods. Administrators can influence whether research-based teaching strategies are successfully implemented in their programs by improving and supporting these aspects of program design and management.

Staff qualifications and experience.

At a minimum, instructional staff need to meet the qualifications that are required by state and federal statutes. But in the field of adult education, these qualifications are often very broad and do not require specific degrees or experience in teaching adults (e.g., any type of bachelor's or master's degree in education or a related field is acceptable). It is even rarer to find requirements for experience in teaching specific levels of learners, as would be true of K-12 teachers (e.g., low-literate adults, English-language learners or students with learning disabilities). Administrators can strengthen staff qualifications by requiring that instructors, especially newly hired staff, have appropriate degrees, certifications and/or solid experience in teaching adult learners and in their

content area (e.g., basic reading, English, or high school equivalency). For existing staff who have different degrees than are required by reauthorized statutes, administrators should ensure that they receive appropriate credentials or training through professional development.

On-going professional development.

Effective, meaningful professional development is well-planned and relates to the goals of the particular education program, the needs of staff, and program improvement plans that are identified through annual evaluations. In relating to the goals of the education program, professional development also relates to the needs of the program's participants (e.g., "literacy" in an adult basic education or family literacy program, or "work-related skills" in a job training program). In addition to identifying the types of professional development that are needed, administrators need to directly provide or provide access to such professional development. And for true changes and improvements to occur, support for performance must be provided that includes practice, feedback, self-reflection, peer teaching and coaching, and review of effectiveness.

Evaluating the effectiveness of teaching strategies based on learner outcomes.

As part of an annual local evaluation, program staff need to collect and analyze data that relate the instructional services, materials and strategies of specific adult education providers to the test data, and other measures of progress, of learners. Programs must also track specific cohorts of learners who receive instruction from teachers who use the new research-based practices in order to study whether they are being implemented effectively. It is not sufficient, or informative, to simply report test scores without investigating the reasons why they do or do not improve. The purpose of any type of evaluation is to explore cause and effect. In an education program, evaluation findings are then used to make informed decisions about how to improve services and instruction to enable students to achieve learning goals.

Suggested reading

Bransford, J., Brown, A., & Cocking, R.R. (1999). How people learn: *Brain, mind, experience, and school.* Washington, DC: National Academy Press.

Byrnes, J.P. (2001). Minds, brains, and learning: *Understanding the psychological and educational relevance of neuroscientific research.* New York, NY: The Guilford Press.

Cromley, J. (2000). Learning to think, learning to learn: *What the science of thinking and learning has to offer adult education*. Washington, DC: National Institute for Literacy.

Cross, K.P. (1992). *Adults as learners: Increasing participation and facilitating learning.* San Francisco, CA: Jossey-Bass.

Cross, K.P., & Steadman, M.H. (1996). *Classroom research: Implementing the scholarship of teaching.* San Francisco, CA: Jossey-Bass.

Rosenshine, B., & Meister, C. (2000). *Cognitive strategy instruction in reading.* In S. Stahl & D. Hayes (Eds.), Instructional models in reading (pp. 85-107). Hillsdale, NJ: Erlbaum.

Snow, C.E., Burns, S.M., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Wood, E., Woloshyn, V., & Willoughby, T. (Eds.) (1995). *Cognitive strategy instruction for middle and high schools.* Cambridge, MA: Brookline.